

# Harvest for Peace

Maher Tadros, ([metadro@sandia.gov](mailto:metadro@sandia.gov))

History has taught us that wars produce hunger, but we are less aware that mass poverty sows the seeds of conflict and can lead to war. People with no food security have very little to lose. They may see violent actions as their only choice. They may try to improve their lives by joining a group committed to destabilizing the government, or striking out at their neighbors who are ethnically different, or taking part in illegal activities, such as growing and smuggling drugs. From Rwanda to Mexico to Sri Lanka, scarce food, water, and land resources create environmental degradation, poverty, war, and migration. Hunger is used as a weapon of war as well. Adversaries try to starve their opponents into submission. Wells are poisoned and farmers' fields are mined, often halting agriculture until long after the conflict has ended.

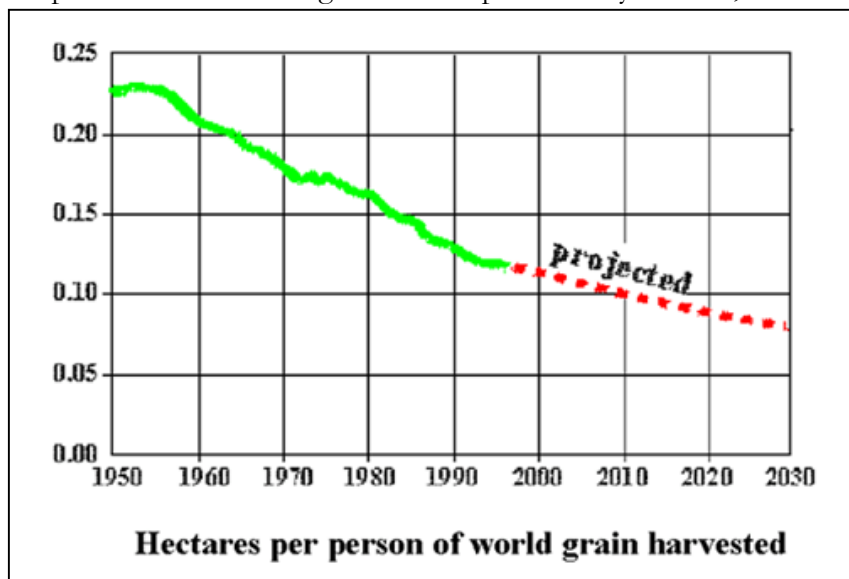
The agricultural sector of the economy supplies the bulk of the livelihood in most developing countries, and when this sector is allowed to falter, internal armed conflict often ensues. The Worldwatch Institute has concluded that water and food are the most underestimated resource issue that the world is facing. These problems are projected to get much worse unless the world takes immediate steps to reduce water use, and to stabilize population.

---

**“The agricultural sector of the economy supplies the bulk of the livelihood in most developing countries, and when this sector is allowed to falter, internal armed conflict often ensues.”**

---

The International Food Policy Research Institute has concluded that: the world's farmers must produce 40% more grain by the year 2020, the developing countries will double their cereal imports, and 60% of these imports will likely have to come from the United States. The figure shows the hectares of arable land likely to be available for grain harvest per person. The downward trend is due to both population increases and losses of arable land due to draughts and urbanization. The loss of cropland offsets modest gains in land productivity. Indeed, as harvested grain area shrank by 5.6



percent between 1990 and 1994, grain yield per hectare rose by 2.8 percent, which translates into a total decline in grain harvest of 2.8 percent.

During 1989-1997, internal or “intrastate” conflicts accounted for the bulk of global violence. Eighty-eight of the 103 conflicts were domestic. Examples of the new internal wars include the civil war in Rwanda in 1993, which killed several hundred thousand people in just three

months, civil wars in Sierra Leone, Angola, Somalia, and the Republic of Congo, guerilla insurgencies in Colombia and Peru, and the Chiapas Indian insurgency in Mexico. These conflicts have largely dealt with problems over land ownership, environmental change, water scarcity, and food shortages, which are described below.

**Land Ownership:** In several of the conflicts in Africa, South Asia, South and Central America, a call for the redistribution of land has been an important part of the ideological claims of the opposition movements. Examples include conflicts between Senegal and Mauritania, the Chiapas rebellion in Mexico, the guerilla movements in Colombia, and the Naxalite rebellion in India.

---

**“However, as world population grows and as global interdependence increases, the national security of the United States may well depend on reducing conflicts over resources.”**

---

**Environmental Change:** In the Sahel region of Africa, environmental change, particularly desertification, has disrupted people’s traditional livelihoods and caused conflict in Mali, Niger, and Chad. In Papua, New Guinea, environmental destruction resulting from the Panguna copper mine spurred armed conflict.

**Water Scarcity:** Disputes in the Middle East in Israel, Lebanon, Syria, and Jordan have been linked to water, particularly to the Jordan River. The Ganges and Nile rivers have also provoked disputes, although none has resulted in armed conflict.

**Food Shortages:** Riots over high food prices or shortages have occurred throughout history. The riots in Indonesia and Lesotho in 1998 stemmed from the sudden rise in the prices of food.

## Conclusions

The rehabilitation of agriculture is a central condition for reducing violence, through its role in improving development, reducing poverty, and preventing environmental destruction. Building peace and prosperity will require greater attention to this sector by both the developed and the developing countries. However, since the end of the Cold War, wealthy states have cut back on aid, have installed protectionist measures against imports from poor countries, and have failed to provide adequate relief to war-torn societies. Developed countries eventually pay the price of these conflicts through the costs of international peace keeping efforts or by providing aid to large refugee populations, as millions migrate from war-ravaged areas.

An example of a success story is India, which is beset with immense poverty but has escaped widespread violence by providing poor farmers with high-tech seeds and extension services.

At first glance food production and water resources may appear to be outside the scope of US National Security Laboratories. However, as world population grows and as global interdependence increases, the national security of the United States may well depend on reducing conflicts over resources. Our laboratories have skills and assets that would permit them to contribute technology-based system solutions to global resource problems. The Advanced Concepts Group is now looking at how the United States might better “Wage Peace” by addressing global resource issues. Our focus, at this time, is on freshwater resources. Specifically, we are developing ideas and programs to do the following:

- decrease water evaporation losses from lakes, reservoirs, and open fields; increase food production with less water from less land by developing advanced concepts for protected agriculture,
- improve clean water supplies in an effective economical way; produce freshwater at a low cost from brackish and sea water; and
- enhance overall water management strategies by applying the Sandia-developed vital issues process for engaging stakeholders in resolving difficult, complex resource management problems.